

# subject review

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## Laparoscopic Repair of Traumatic Intraperitoneal Bladder Rupture

### Abstract

A 38-year-old female fell down while intoxicated, sustaining an intraperitoneal bladder rupture and a fracture of the left superior pubic ramus. She underwent laparoscopic bladder repair by the trauma and urology services approximately 24 hours after injury; laparoscopy verified the absence of other visceral injuries. The repair was tested with 180 cc of normal saline. During the same hospitalization the patient underwent open stabilization of the pubic ramus and the symphysis pubis through a small suprapubic incision. She was discharged on the fifth hospital day with a Foley catheter in place.

We believe that selected trauma patients, especially those with single organ injury, are good candidates for laparoscopic examination and treatment.

### Introduction

Traumatic bladder rupture can occur as an isolated injury or in association with other truncal or extremity injuries. Intraperitoneal bladder rupture is usually addressed by operative repair combined with temporary catheter decompression. The availability of improved diagnostic imaging and minimally invasive techniques calls for a reevaluation of traditional strategies for managing traumatic bladder rupture. We report a case of successful laparoscopic repair of an intraperitoneal bladder rupture and review the relevant literature.

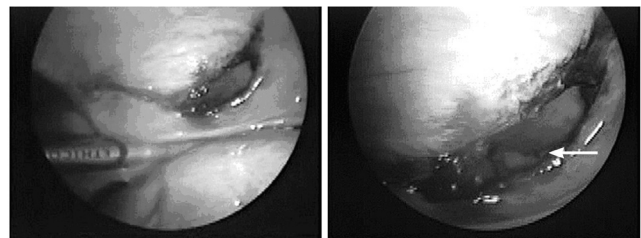
### Case Report

A 38-year-old female fell down several stairs while intoxicated. She presented to her local hospital the next morning, complaining of pelvic pain and inability to void. At initial evaluation the patient was hemodynamically stable with mild suprapubic tenderness and tenderness upon lateral compression of the pelvic bones. Laboratory workup was only significant for gross hematuria. A CT scan with intravenous and oral contrast revealed dependent

intraperitoneal fluid with no bowel injury and a left superior-inferior pelvic ramus fracture. A CT cystogram revealed an intraperitoneal bladder rupture.

The patient was transferred for management approximately 24 hours after the time of injury. Based on a low suspicion for solid organ or gastrointestinal tract injury, laparoscopy was chosen to evaluate the abdomen, with the intention of approaching the pelvic fracture and bladder rupture through a limited pelvic incision. The intraperitoneal bladder rupture was identified and no other intraperitoneal injuries were seen. (Figure 1 a-b) The bladder was repaired laparoscopically in two layers using 2.0 polyglycolic acid sutures with a continuous intracorporeal suture. Distention of the bladder with normal saline revealed no extravasation. (Figure 2 a-b) During the same hospitalization the pelvic fracture repair was performed through a small suprapubic incision. A follow-up cystogram two weeks later demonstrated no extravasation. The Foley catheter was removed and the patient had no difficulty voiding.

**Figure 1 (a and b).** Intraperitoneal laceration of the dome of the bladder sustained in a fall (a) and image (b) demonstrates the tip of a Foley catheter within the bladder



**Figure 2 (a and b).** Intracorporeal suturing of bladder injury with 2-0 polyglycolic acid (a) and completed repair under test by saline instillation through the Foley catheter (b)



## Discussion

The role of laparoscopy for trauma is still being defined. It carries the potential to reduce both the incidence of nontherapeutic laparotomy and the morbidity associated with therapy of specific injuries. There are several review articles characterizing laparoscopy by its diagnostic or therapeutic value in trauma. Patient selection is a critical factor, since laparoscopy should only be considered in the presence of hemodynamic stability.<sup>1,2</sup>

Complications related to laparoscopic access are infrequent and generally reported in the range of 0.3–1%. Most of the literature pertaining to laparoscopic repair of bladder injury deals with the occurrence of bladder injury during elective laparoscopic surgery. Three previous case reports describe laparoscopic repair of traumatic bladder rupture, two of which describe a single case of laparoscopic repair for traumatic intraperitoneal bladder rupture. In the only article encountered in the American literature, three cases are described utilizing laparoscopy for trauma, one of which involved bladder repair.<sup>3–12</sup>

In the current case, the diagnosis of intraperitoneal bladder rupture was made preoperatively. Solid organ injury can be effectively ruled out by CT scanning. Intestinal injury is rare, and difficult to diagnose by preoperative imaging. The notable benefit of laparoscopy was the reliable exclusion of an associated small bowel injury, without requiring open exploration at the time of the planned bladder repair. The combined incisions used for bladder repair and subsequent orthopedic repair produced relatively little morbidity compared to a laparotomy incision. Intraperitoneal bladder injuries usually require two layer closure to ensure a watertight repair and surgeons not adept at intracorporeal suturing may encounter a longer duration of the operation as compared to open repair. This limitation may be overcome with automatic suturing devices which facilitate the use of minimally invasive techniques to place intracorporeal stitches efficiently.<sup>13</sup>

Besides the usual precautions, potential concerns about using laparoscopy in the setting of trauma include gas embolization and aggravation of pneumothorax in the presence of diaphragmatic injury. However, these concerns can be minimized in the stable and appropriately evaluated patient. Identification of patients that may benefit from laparoscopic repair of intraperitoneal bladder rupture requires coordination between the trauma and urologic services. Careful patient selection and operative planning has made laparoscopy a feasible option for bladder repair, with less morbidity and faster convalescence relative to standard surgical approaches. This case illustrates the use of laparoscopy to provide these advantages with no difference in surgical outcome.

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